

Introduction to CA AppLogic® for System z

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CA Technologies, Inc.

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Abstract



AppLogic allows web applications to be deployed virtually on a scalable grid using a drag-and-drop web browser interface. Applications can scale from a fraction of a server up to the whole grid, based on current demand. CA AppLogic for System z extends this support to Linux guests under z/VM, allowing your mainframe to participate as a resource in the computing grid and play a key role in your private cloud infrastructure.

In this session, the speaker will present a technical overview and demo of CA AppLogic for System z.



Agenda



- Current Deployment Options for Linux on System z
- CA AppLogic for System z - The Grid Architecture
- Closer Look at the Solution
- Using CA AppLogic for System z
- Summary



Agenda



- **Current Deployment Options for Linux on System z**
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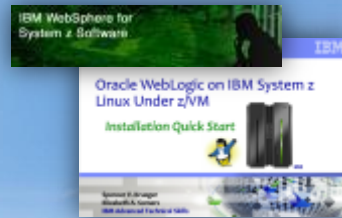


Current Deployment Options

Just provision
Linux container



Add virtual
infrastructure
and/or middleware



Provision entire
application stack

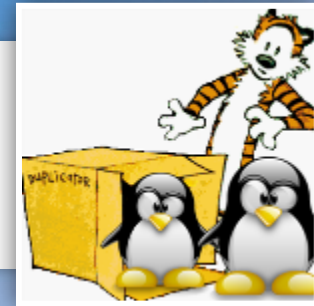


Current Deployment Options

Just provision
Linux container



Clone a
golden
image



Add virtual
infrastructure
and/or middleware



Script
customization



Provision entire
application stack



Manually install
and configure



Evaluating Deployment Options

Provisioning just Linux or entire application? Consider...

Provisioning

- Speed to value
- Accuracy
- Auditing and reporting
- Resource allocation and constraints



Ongoing Management

- Manage to service level objectives
- Linux patching and upgrades
- Component patching and upgrades etc.
- Charge/show back



Controlled De-provisioning

- End of application lifecycle
- Varying capacity demands
- Efficient use of system resources



CA AppLogic® for System z different deployment approach

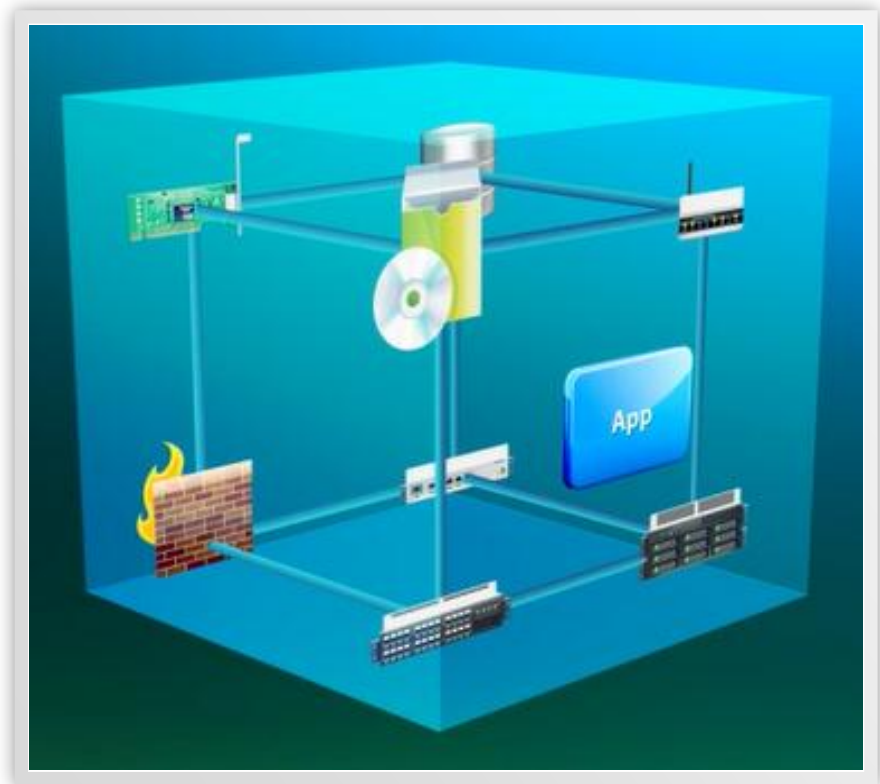
Virtualize Linux on System z
application and its
ENTIRE infrastructure

Firewalls
Load balancers
Web servers
App servers
Storage



CA AppLogic® for System z Virtualized Business Service

Create, test, provision,
deploy and manage it all as
a single unit called a
Virtualized Business Service



Virtualized Business Service

benefits of a virtual business service

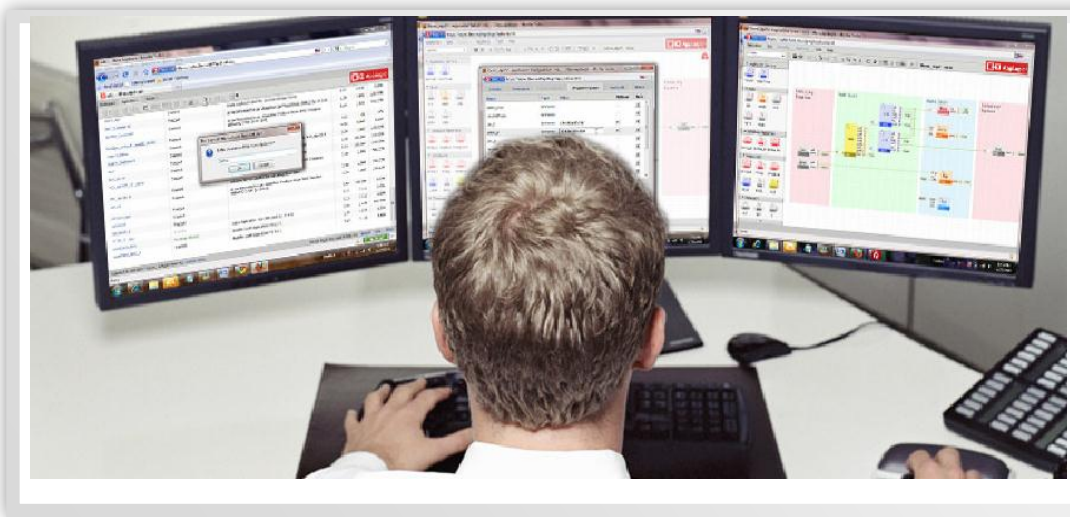
ability to deploy applications & services in minutes

More Agility for Enterprises

- Build and deploy apps using appliances
- On-demand elasticity and flexibility
 - Migrate entire apps instantly
 - Replicate and scale apps instantly
- Work through an intuitive GUI, not by pulling cables and copying gold images

Leverage Power of Linux on System z

- Increase RASSS
- Reduce datacenter costs
- Reduce management costs
- Easier interoperability with z/OS
- Power of cloud platform



Agenda



- Current Deployment Options for Linux on System z
- **CA AppLogic for System z - The Grid Architecture**
- Closer Look at the Solution
- Using CA AppLogic for System z
- Summary



What is CA AppLogic® for System z?



Grid operating system that runs and scales existing Linux-based applications as Linux on System z guests on a z/VM system

Capabilities Include:

- **Deploy existing Linux-based applications on a grid without changing any code**
- **Scale the resources used by each application from a fraction of a server up to the whole server**
- **Manage all applications and storage with only a web browser**
- **Define role-based access levels for grid and grid resources (i.e., applications)**
- **Create and maintain standard virtual server builds as appliances – presented through GRID catalog**
- **Create cataloged z/OS resource gateway appliances for use in applications:**
 - **Datacom**
 - **IDMS**
 - **CICS**
 - **DB2**
 - **IMS**

Vendor-neutral and supports open source middleware such as Apache, MySQL, and JBoss



Grid Architecture

Basic Premises



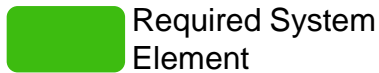
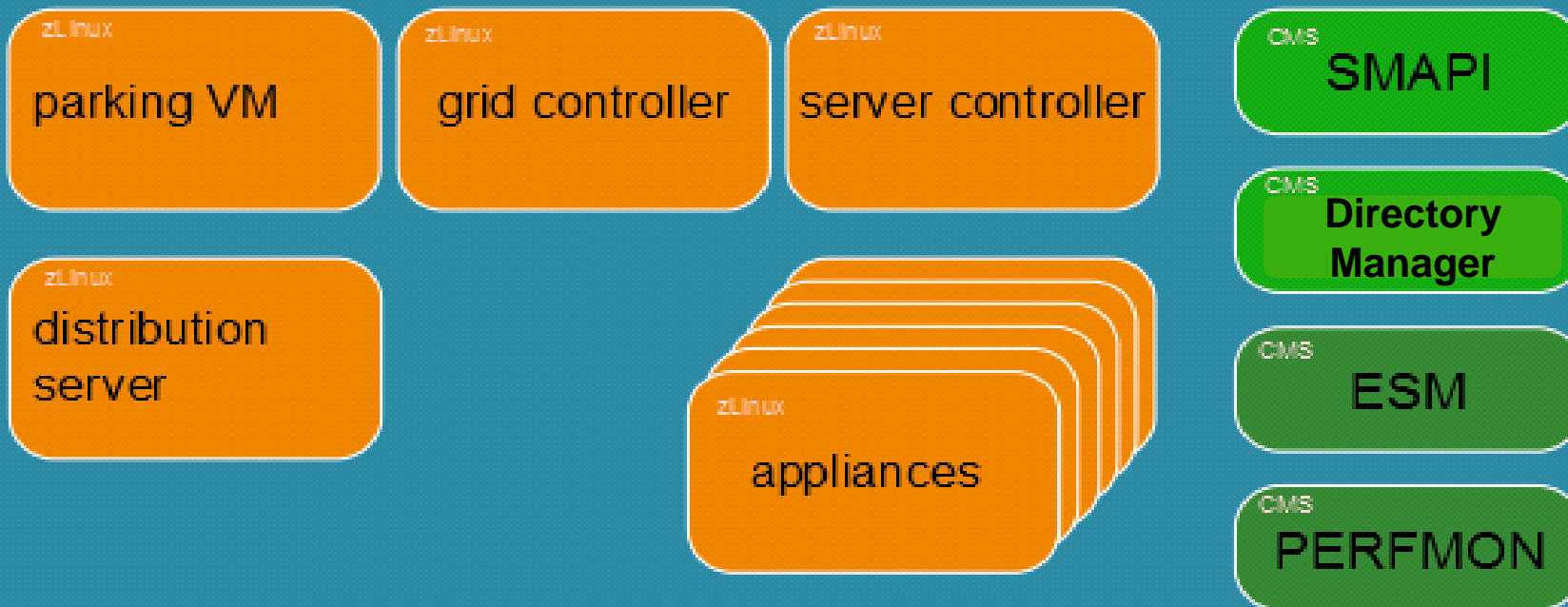
- **AppLogic grid will run under z/VM on a System z LPAR**
- **Grid cannot span multiple LPARs**
- **LPAR and the z/VM will run only AppLogic**
 - Exception of service applications such as directory management, external security manager, performance management, SMAPI
- **There will be only one grid running on the LPAR**
- **Current Linux distributions certified AppLogic for System z**
 - Red Hat Enterprise Linux 6.x
 - CentOS 6.x
 - SUSE Linux Enterprise Server 11 SP 2
- **Appliance Kit (APK) required on each virtual machine running on grid**
 - Set of scripts that enable communications with the grid controller, auto-configuration of the appliance network interfaces, and the ability to obtain property values from the appliance boundary



Grid Architecture

System z LPAR

z/VM



Grid Architecture



Architecture Element	Description
Distribution Server (AL)	<ul style="list-style-type: none">• Linux guest where AppLogic® for System z software is installed• Used to create and deploy the grid controller, server controller, and appliances using the command line tool, ALDO• Stateless: Any instance can perform upgrades and changes to a grid to which it has network access
Appliance	<ul style="list-style-type: none">• Building blocks for applications• Through a user interface, user can create applications using cataloged appliances; which can be scaled and provisioned as required
SMAPI	<ul style="list-style-type: none">• Provides Server Controller's interface to Directory Manager
Directory Manager	<ul style="list-style-type: none">• Provides interface to the user directory where appliances are created on demand• Supports CA VM:DIRECT, CA VM:SECURE, and IBM DIRMAINT
ESM (External Security Manager)	<ul style="list-style-type: none">• Manages permissions for creation of users and disk access• Supports CA VM:SECURE and IBM RACF. (OPTIONAL)
IBM PERFMON	<ul style="list-style-type: none">• Resource utilization monitoring. (OPTIONAL)



Parking Machine

- **Created with each GRID**
- **Owns the GRID Controller**
- **Owns all of the GRID disks**
- **As User entry in the directory**

```
USER ALVO0101 NOLOG      128K 1M G 64
* Parking machine for grid 01
MDISK 0201 3390 1 2500 LNX00F M
MDISK 0202 3390 1 1500 LNX00E M
MDISK 0203 3390 1 8000 LNX00D M
MDISK 0000 3390 1 835 LNX00C WR
MDISK 0001 3390 1 835 LNX00B WR
MDISK 0002 3390 2501 353 LNX00A WR
MDISK 0003 3390 2501 675 LNX00F WR
```

Example user directory entry

- **USER** defines basic properties (name, virtual memory size, privilege class)
- **MDISK** defines minidisks within GRID

Server Controller (SC)



- **Linux Virtual Machine created with each GRID**
- **Manages the provisioned applications**
- **Performs all interfacing with z/VM (virtual machine creation and deletion, minidisk creation and deletion, and so on), using SMAPI and vmcp**

Example user directory entry

- **USER** defines basic properties (name, virtual memory size, privilege class)
- **LOGONBY** establishes ALDO VM access
- **IUCV** establishes communications link to grid
- **SHARE** defines resource (e.g. CPU) usage
- **COMMAND** defines storage resources
- **NICDEFs** define virtual NICs
- **IPL & MDISK** define LINUX boot device

```
USER ALSC01 LBYONLY 1024M 2048M BCDEG 64
* Server Controller for grid 01
MACHINE ESA
LOGONBY ALDO
IUCV ALLOW
IUCV *VMEVENT
OPTION LNKNOPAS LNKSTABL LNKEXCLU
SHARE ABSOLUTE 5% RELATIVE 100 LIMITSOFT
COMMAND DEFINE STORAGE AS 1024M STANDBY
1024M
IPL 0201
CONSOLE 0009 3215 T ALGC01
NICDEF C000 TYPE QDIO DEVICES 3
NICDEF C050 TYPE QDIO DEVICES 3
MDISK 0201 3390 1 2500 LNX00A M
```



Grid Controller (GC)

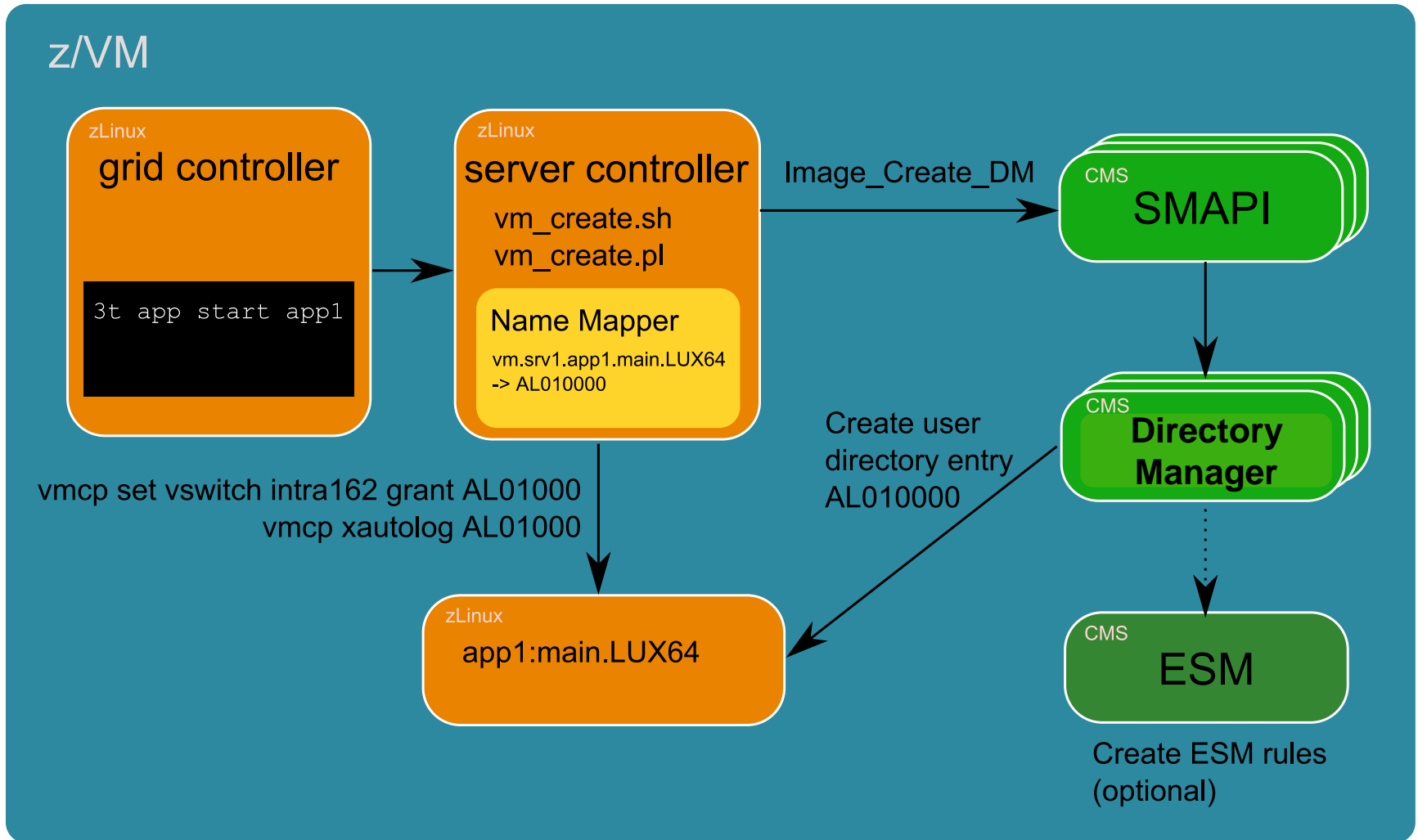
- **Linux Virtual Machine created with each GRID**
- **Manages and monitors the grid**
- **Serves the web user interface**
- **Handles the command line shell commands**

Example user directory entry

- **USER** defines basic properties (name, virtual memory size, privilege class)
- **LOGONBY** establishes ALDO VM access
- **IUCV** establishes communications link to grid
- **SHARE** defines resource (e.g. CPU) usage
- **COMMAND** defines storage resources
- **NICDEFs** define virtual NICs
- **LINK** defines links to minidisks owned by the parking machine
- **IPL** establishes LINUX boot device

```
USER ALGC01 LBYONLY 512M 2048M G 64
* Grid Controller for grid 01
MACHINE ESA
LOGONBY ALDO
IUCV ALLOW
OPTION LNKNOPAS LNKSTABL LNKECLU
SHARE ABSOLUTE 5% RELATIVE 100 LIMITSOFT
COMMAND DEFINE STORAGE AS 1024M STANDBY 1024M
IPL 0201
CONSOLE 0009 3215
NICDEF C000 TYPE QDIO DEVICES 3
NICDEF C050 TYPE QDIO DEVICES 3
LINK ALVO0101 0201 0201 M
LINK ALVO0101 0202 0202 M
LINK ALVO0101 0203 0203 M
```

Grid in action



Appliance Virtual Machines



Appliance entries created on demand

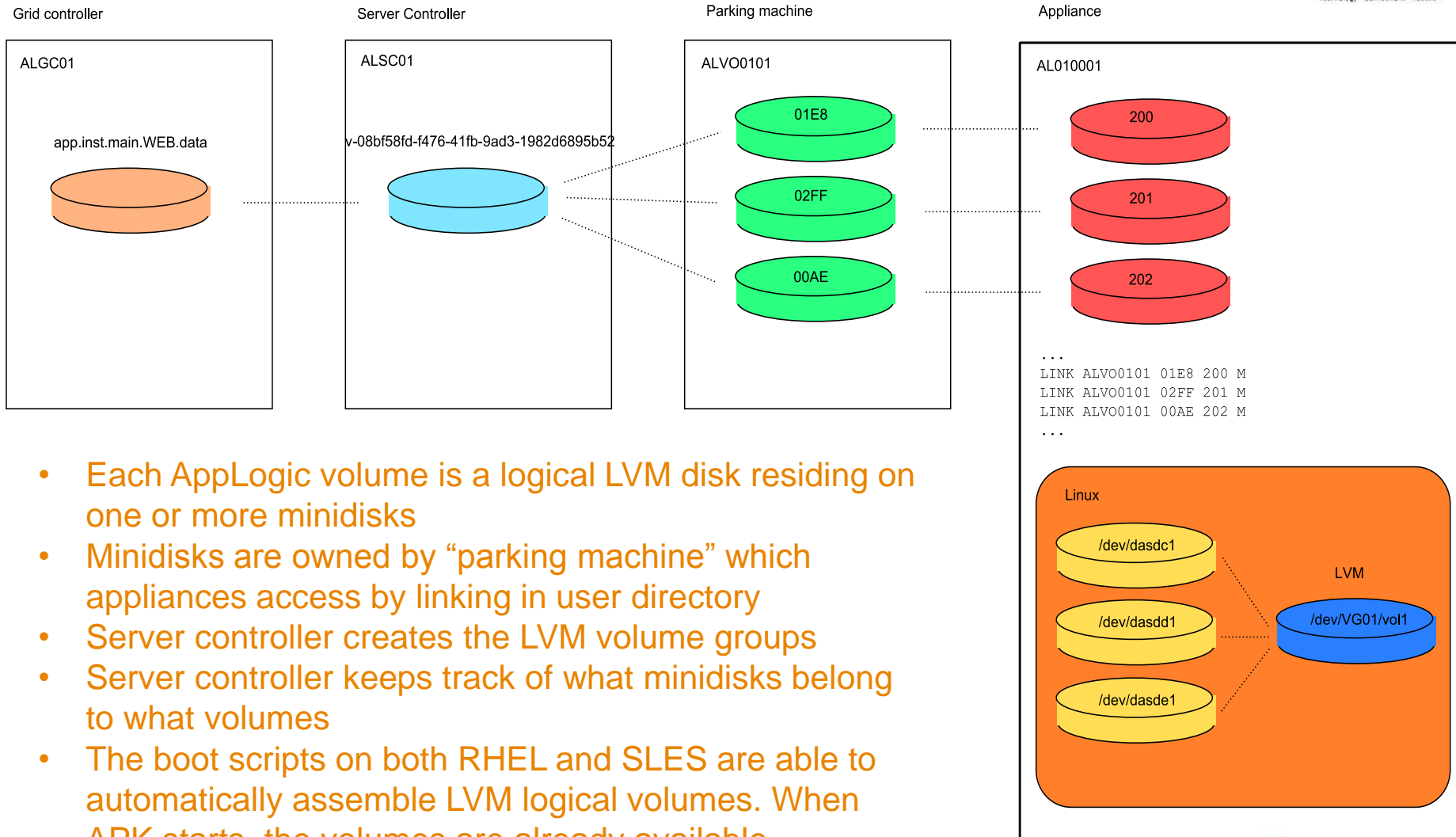
As User entry in the directory
Usually requiring permission of
External Security Manager

Example user directory entry

- **USER** defines basic properties (name, virtual memory size, privilege class)
- **SHARE** defines resource (e.g. CPU) usage
- **LINK** defines links to minidisks owned by the parking machine
- **NICDEFs** define virtual NICs

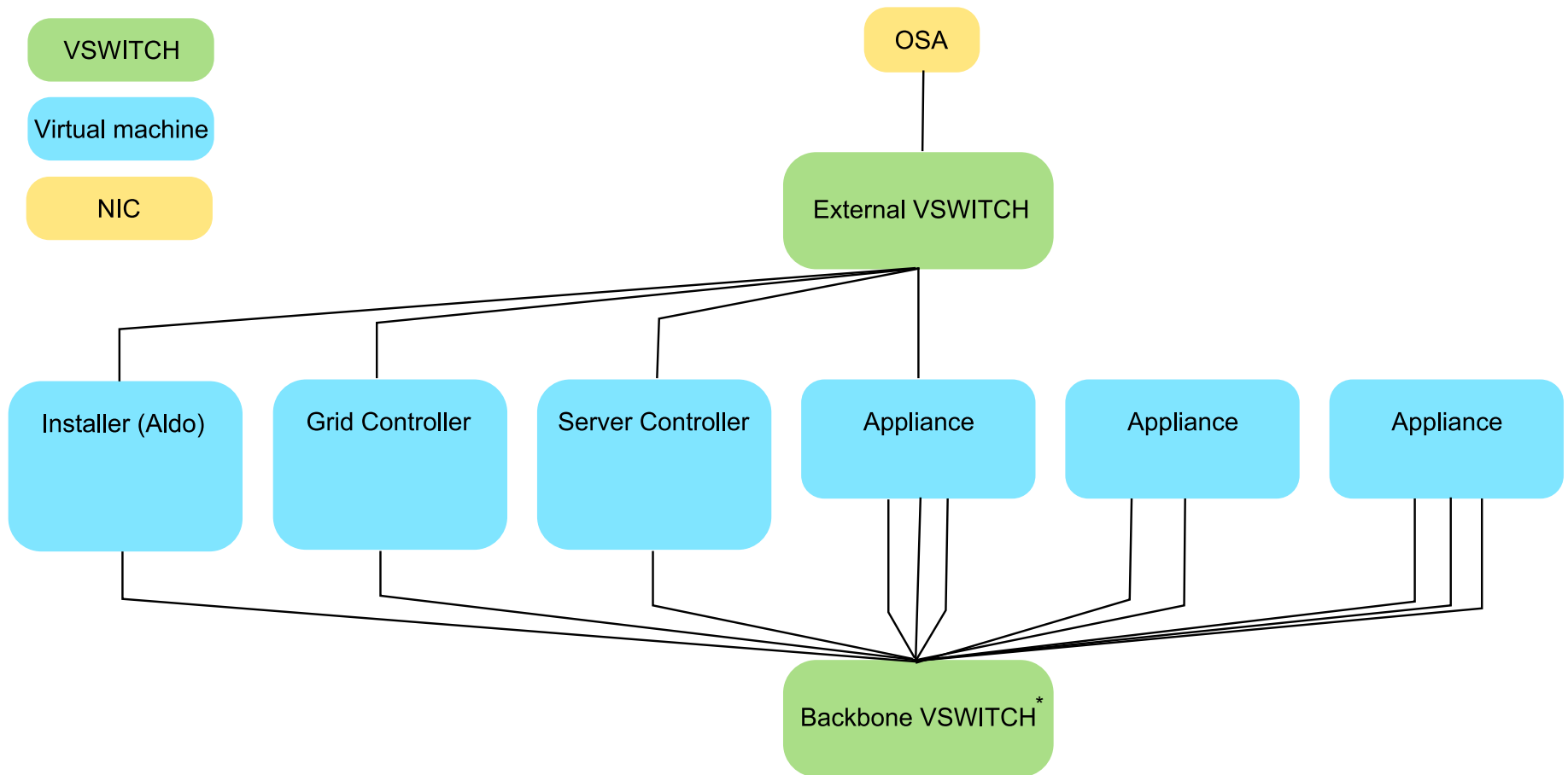
```
USER AL010000 XXXXXXXX 512M 512M G 64
MACHINE ESA
COMMAND SET RUN ON
SHARE RELATIVE 50 ABSOLUTE 2.5% LIMITSOFT
IUCV ALLOW
IPL 0203
XAUTOLOG ALSC01
CONSOLE 0009 3215 T ALSC01
LINK ALVO0201 0028 0203 M
NICDEF C000 TYPE QDIO LAN SYSTEM ABL01
NICDEF C000 DEVICES 3 MACID 101C00
NICDEF C003 TYPE QDIO LAN SYSTEM ABL01
NICDEF C003 DEVICES 3 MACID 101C01
NICDEF C006 TYPE QDIO LAN SYSTEM ABL01
NICDEF C006 DEVICES 3 MACID 101C02
NICDEF C009 TYPE QDIO LAN SYSTEM ABL01
NICDEF C009 DEVICES 3 MACID 101C03
NICDEF C00C TYPE QDIO LAN SYSTEM ABL01
NICDEF C00C DEVICES 3 MACID 101C04
```

Disks



- Each AppLogic volume is a logical LVM disk residing on one or more minidisks
- Minidisks are owned by “parking machine” which appliances access by linking in user directory
- Server controller creates the LVM volume groups
- Server controller keeps track of what minidisks belong to what volumes
- The boot scripts on both RHEL and SLES are able to automatically assemble LVM logical volumes. When APK starts, the volumes are already available.

Networking



***No physical server-to-server communications needed – managed as “virtual wire” with non-routable IPs**

vm2class utility

- Can take a zLinux guest running on the same z/VM as AppLogic, make a copy and convert it to an appliance.
- By default, installs the appropriate appliance kit (APK) and creates a managed appliance
- zLinux must be prepared for conversion – boot and package requirements
- After the zLinux guest is converted, it should be improved with boundary definition and configuration scripts to become a full-feature appliance – but will run as converted
 - Example:
3t util vm2class app_name=sles userid=slesgold vol1_addr=0203
 - **app_name** – Name of the newly created application
 - **userid** – z/VM name (userid) of the zLinux guest to be converted
 - **vol1_addr** – Virtual address of minidisk where zLinux data is located (can have vol2_addr etc. if the guest has multiple minidisks)

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CA AppLogic® for System z System Dashboard



Dashboard

Applications

Logs





Support




Grid1

Status

Account Grid1
AppLogic Version 3.0.52 hf21305964
System Status Running
System Uptime 1 day, 10 hours and 20 minutes
High Availability unavailable | **Important** [Details](#)
Applications 0 running

CPU  4.00 total (3.90 free) ▲ 2.00
Memory  50GB total (14.89GB free) ▲ 8GB
Storage  1.51TB total (193.49GB free)
Bandwidth  20.00Gbps total (20.00Gbps free)
Oversubscription Disabled

 [Grid Shell](#)

Messages

Important **Fri 09 Aug 2013 08:17:35 AM EDT** - Grid restarted by operator on Fri 09 Aug 2013 08:16:34 AM EDT.

[Delete all](#)

Account Info

Public Network

Application IP Range	Netmask	Gateway	DNS Servers
141.202.162.241 - 141.202.162.250	255.255.255.0	141.202.162.1	141.202.1.108 130.119.24.108 130.200.10.108



CA AppLogic® for System z System Dashboard



Dashboard Applications Logs Support

Status

Account Grid1
AppLogic Version 3.0.52 hf21305964
System Status Running
System Uptime 1 day, 10 hours and 20 minutes
High Availability unavailable | **Important**
Applications 0 running

Grid She

Messages

Important Fri 09 Aug 20
Delete a

Account Info

Public Network

Application IP Range
141.202.162.241 - 141.202.162.250

Shell - Grid1 - CA 3Tera AppLogic - Mozilla Firefox
https://141.202.162.30/applogic/shell.html

```
Welcome to CA 3Tera AppLogic grid Grid1
Type "help" for list of commands

Grid1> 3t srv list
Name State CPU Mem (MB) BW (Mbps) Role
      Alloc Free Alloc Free Alloc Free
-----
srv1 up 0.00 3.90 0 15243 0 20000 primary

Grid1>
```

Transferring data from 141.202.162.30...

130.200.10.108



CA AppLogic® for System z Applications



Dashboard Applications Logs Support

AppLogic®

Application Name	State	Description	CPU	Mem	BW
Install_DB2_v10_CentOS62 (template)	Stopped	Application for installing IBM DB2 Database on CentOS 6.2	0.10	2.00G	100.00M
Install_Oracle_g11_CentOS62 (template)	Stopped	Application for installing Oracle Database g11 on CentOS 6.2	0.10	2.00G	100.00M
Lamp_r18 (template)		LAMP Application (v2.0.1-1 s390)	1.05	1.53G	900.00M
Lampx4_r18 (template)		LAMP Application (v2.0.1-1 s390)	1.35	1.81G	1.30G
SugarCRM_r19 (template)		Fully featured, scalable CRM Application, based on SugarCRM's Sugar Open Source 5.2.0 (v5.2.1-1)	2.05	3.06G	1.45G
Sys_Filer_Linux (template)		Linux Filer Application (v4.1.0-1)	0.05	256.00M	1.00M
VDS64_CentOS62_r2 (template)		Virtual Dedicated Server - Based on 64-bit CentOS 6.2 (v2.0.1-1 s390)	0.25	512.00M	1.00M
WS_API_r1 (template)		REST - based AppLogic Web Service API (v1.0.20-1)	1.00	1.41G	1.40G
WS_API_SAMPLE_r1 (template)		Applogic API Sample Application	1.05	1.66G	1.15G
zOS_SvcPt_Admin_r1 (template)		Applogic z/OS Service End Point Administration UI	1.05	2.00G	1.20G
lamp-mymsg		LAMP Application (v2.0.1-1 s390) with myMesyuarat installed - PoC	1.05	2.03G	900.00M
nt-mymsg		LAMP Application (v2.0.1-1 s390) with myMesyuarat installed - PoC	1.05	2.03G	900.00M
SHARE-DEMO			1.05	1.22G	950.00M
ThreeTier			1.95	2.59G	2.30G
WAS_rebuild		WAS build, using 141.202.162.245, .246, and .247	0.60	1.44G	950.00M

nt-mymsg

- Start
- Stop
- Restart
- Edit**
- View
- Configure
- Login
- Monitor
- Provision
- Migrate From
- Migrate To
- Delete
- Rename
- Copy
- Documentation



CA AppLogic® for System z Infrastructure Editor – Catalog



The screenshot displays the CA AppLogic Infrastructure Editor interface. The top menu bar includes Application, Edit, Assembly, Appliance, Tools, and Help. The main window shows a catalog of components organized into several categories:

- Application Servers:** JBOSS64, TOMCAT64
- Database Appliances:** PGSQL64, MYSQL64, MYSQLR64
- Gateways:** NET, OUT, IN, VPN, INSSLR
- Generic:** LUX64, LINUX64
- Misc. Appliances:** NAS
- Switches:** HALB, PS8, L3LB
- Web Servers:** WEBx8, WEB64, WEBx4
- svcpt Templates:** Generic_sv, Generic_sv
- New Singletons:** (Two icons)

The interface also features a toolbar with various icons for editing and a sidebar on the left with a search field and a list of components. The main workspace shows a diagram with nodes and connections, including labels like 'in', 'srv', 'dbase', 'log', 'rout', and 'mon'.



CA AppLogic® for System z Infrastructure Editor – Appliance Instances



Application Edit Assembly Appliance Tools Help

system SHARE-DEMO main AppLogic®

Application Servers: JBOSS64 TOMCAT64

Database Appliances: PGSQL64 MYSQL64 MYSQLR64

Gateways: NET OUT IN UPN INSSLR

Generic: LUX64 LINUX64

Misc. Appliances: NAS

Switches: HALR PS8 L3LR

Public Zone Application Zone

web64

- Attributes
- Resources
- User Volumes
- Property Values
- Notes
- Login
- Branch Class
- View Boundary
- Class Documentation



CA AppLogic® for System z

Infrastructure Editor – Appliance Instances



Attributes	Resources	User Volumes	Property Values	Notes
General				
Name	<input type="text" value="web64"/>			
Class Name	system.WEB64			
Standby	<input type="checkbox"/>			
Start Order	<input type="text"/>			
Ignore Failed Start	<input type="checkbox"/>			
Restart Mode	<input type="text" value="Self"/>			
Advanced				
Boot Timeout Override	<input type="checkbox"/>	Timeout	<input type="text" value="120"/>	sec
Shutdown Timeout Override	<input type="checkbox"/>	Timeout	<input type="text" value="120"/>	sec
Field Engineering Options	<input type="checkbox"/>	FE Code	<input type="text" value="0"/>	
VLAN ID	<input type="text"/>			
<input type="button" value="OK"/> <input type="button" value="Cancel"/> <input type="button" value="Documentation"/> <input type="button" value="Help"/>				



CA AppLogic® for System z Infrastructure Editor – Appliance Instances



The screenshot displays the CA AppLogic Infrastructure Editor interface. On the left is a navigation pane with a 'Contents' and 'Search' header. Below it, there's a 'Back to Bookshelf' link and a tree view of the system catalog. The tree view is expanded to 'System Catalog' > 'Application Server Appliances' > 'Web Server Appliances', where 'WEB64 - Web Server Appliance' is selected and highlighted. The main content area shows the breadcrumb path: 'System Catalog > Web Server Appliances > WEB64 - Web Server Appliance'. Below this is the title 'WEB64 - Web Server Appliance' and a small thumbnail image of the appliance. A table titled 'At a Glance' provides key details. Below that is a 'Functional Overview' section with descriptive text.

Contents Search

Back to Bookshelf

- Appliance Catalog Reference Guide
- Legal Notices
- Contact CA Technologies
- Catalog Overview
- System Catalog
 - Application Server Appliances
 - Web Server Appliances
 - WEB64 - Web Server Appliance**
 - WEBx4 - Scalable Web Server Appliance
 - WEBx8 - Scalable Web Server Appliance
 - Database Appliances
 - Miscellaneous Appliances
 - Switches
 - Gateways
 - Generic
 - svcpt Templates
 - Filer Catalog

System Catalog > Web Server Appliances > WEB64 - Web Server Appliance

WEB64 - Web Server Appliance

Catalog	System
Category	Web Servers
User volumes	yes
Min. memory	160 MB
OS	Linux
Constraints	no

Questions/Comments [Ask Forum](#)

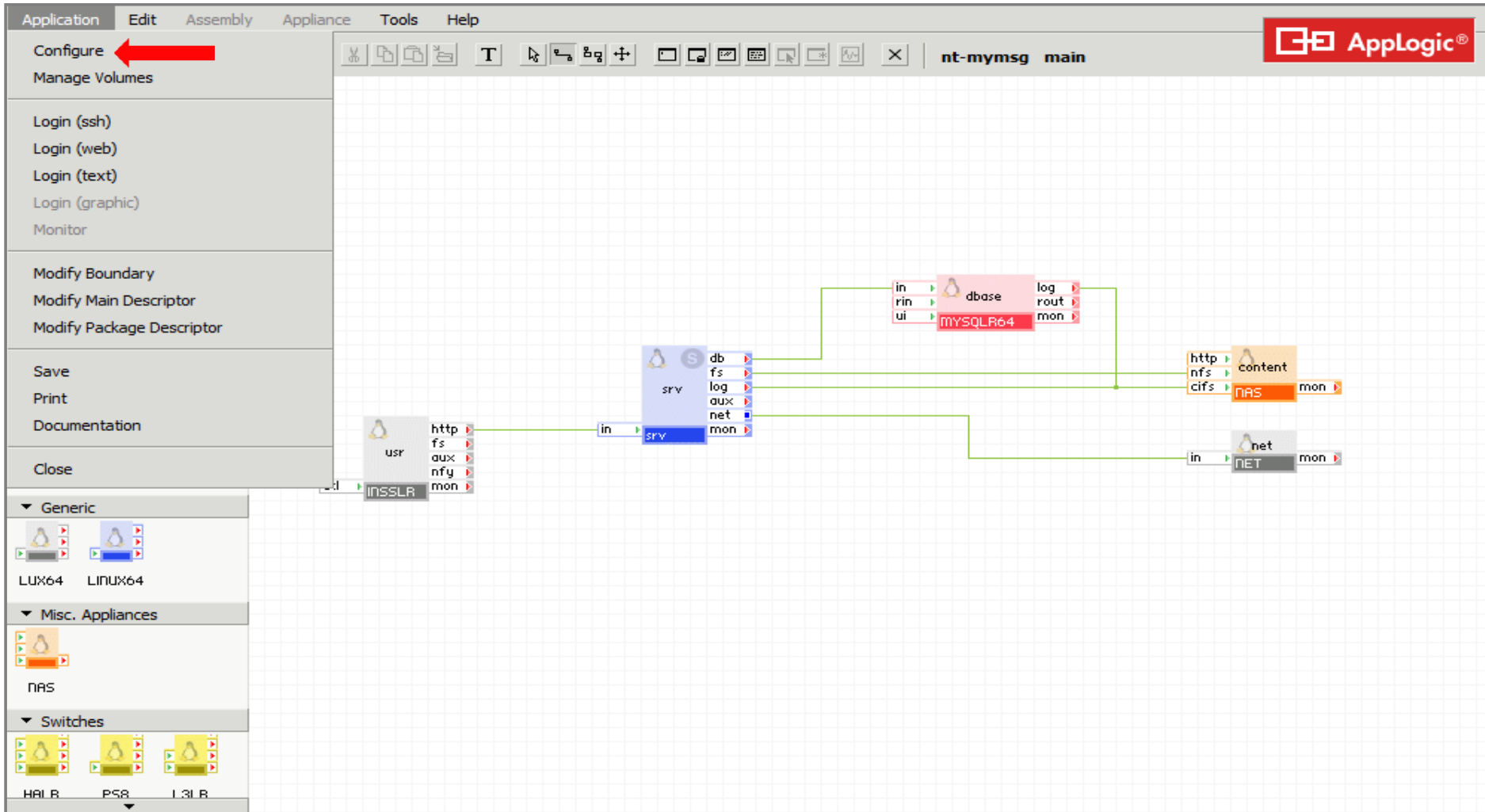
Functional Overview

WEB is a web server appliance that is based on the Apache open source web server software (see <http://httpd.apache.org>).

WEB serves static web content and executes scripts from a user-configurable read-only content volume. The paths to the documents and scripts are configurable. The same volume can be shared between multiple web servers and/or other appliances serving different content.

WEB has three generic output terminals that are intended for accessing external services from scripts on the content volume. The db terminal is for accessing a database. The fs terminal is for accessing shared file storage (using NFS). The aux terminal is for any auxiliary access (for example, sending email messages to an SMTP server).

CA AppLogic® for System z Infrastructure Editor – Assembly



CA AppLogic® for System z Infrastructure Editor – Assembly



General		Resources		User Volumes		Property Values		Protocols		Notes		Security	
Name	Type	Value		Options		Info							
hostname	String			[icon]		[icon]							
in_ip	IP_owned	141.202.162.244		[icon]		[icon]							
out_ip	IP_owned	141.202.162.243		[icon]		[icon]							
netmask	IP	255.255.255.0		[icon]		[icon]							
gateway	IP	141.202.162.1		[icon]		[icon]							
dns1	IP	141.202.1.108		[icon]		[icon]							
dns2	IP			[icon]		[icon]							
timezone	String			[icon]		[icon]							



CA AppLogic® for System z Infrastructure Editor – Assembly



Application Edit Assembly Appliance Tools Help

system [Icons] nt-mymsg main **AppLogic®**

Application Servers

JBOS64 TOMCAT64

Database Appliances

PGSQL64 MYSQL64 MYSQLR64

Gateways

NET OUT IN

UPN INSSLR

Generic

LUX64 LINUX64

Misc. Appliances

NAS

Switches

HAR PSR I.31R

usr http fs aux nfy mon

ctl inSSLR

App Volume	Size	Filesystem	Info
fs	200M	ext3	[Info Icon]
mysql	150M	ext3 snapshot	[Info Icon]

Add Delete Rename Resize Manage

Done Help



CA AppLogic® for System z Infrastructure Editor – Assembly



App Volume	Size	Filesystem	Info
fs	200M	ext3	[Info Icon]
mysql	150M	ext3 snapshot	[Info Icon]

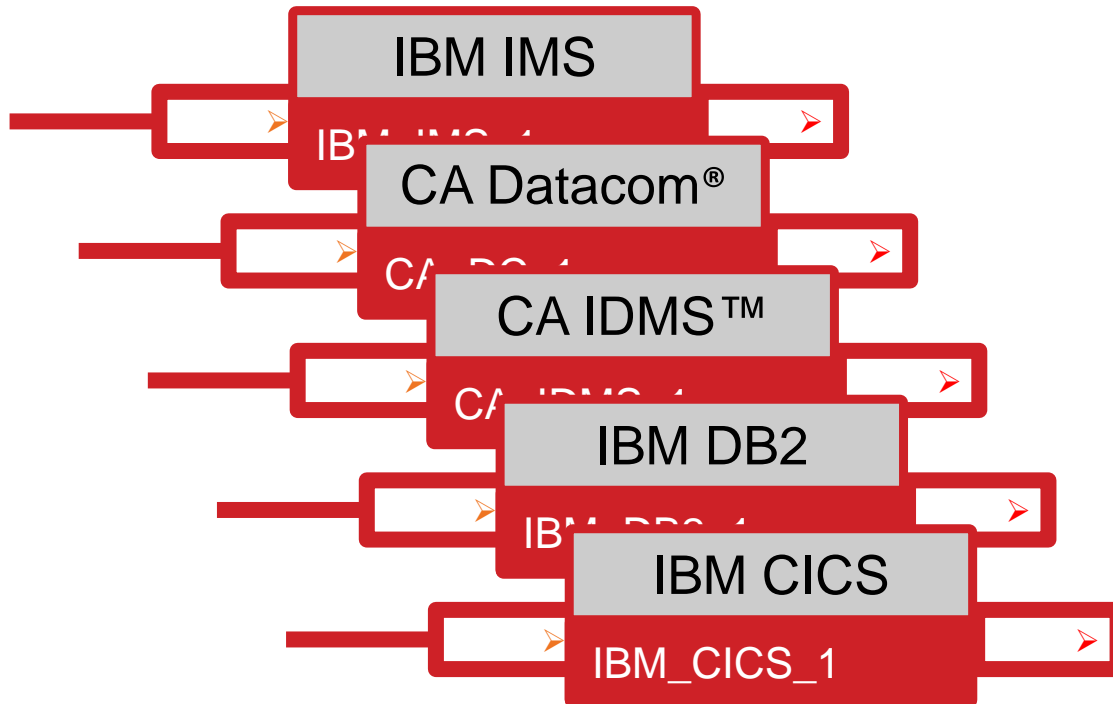
Buttons: Add, Delete, Rename, Resize, Manage (circled in red), Done, Help



CA AppLogic® for System z

z/OS Service End Point

Five certified z/OS subsystems:



...or create your own



Service Endpoints

- **Behave as connectors to off-grid resources**
- **Simply a package of connection information**
 - IP and port for generic case
 - Available properties customizable per target class known as ‘type’
 - CICS, DB2, myCustomServer,...
 - Instance specific values can be created by z/OS admins and used by AppLogic Application Developers without having *any* z/OS knowledge
 - Connected appliance can retrieve properties for internal use
- **zOS_SvcPt_Admin application delivered for creating SvcPt Types and SvcPts**
- **Allows trivial swap between dev and production databases and many other capabilities**

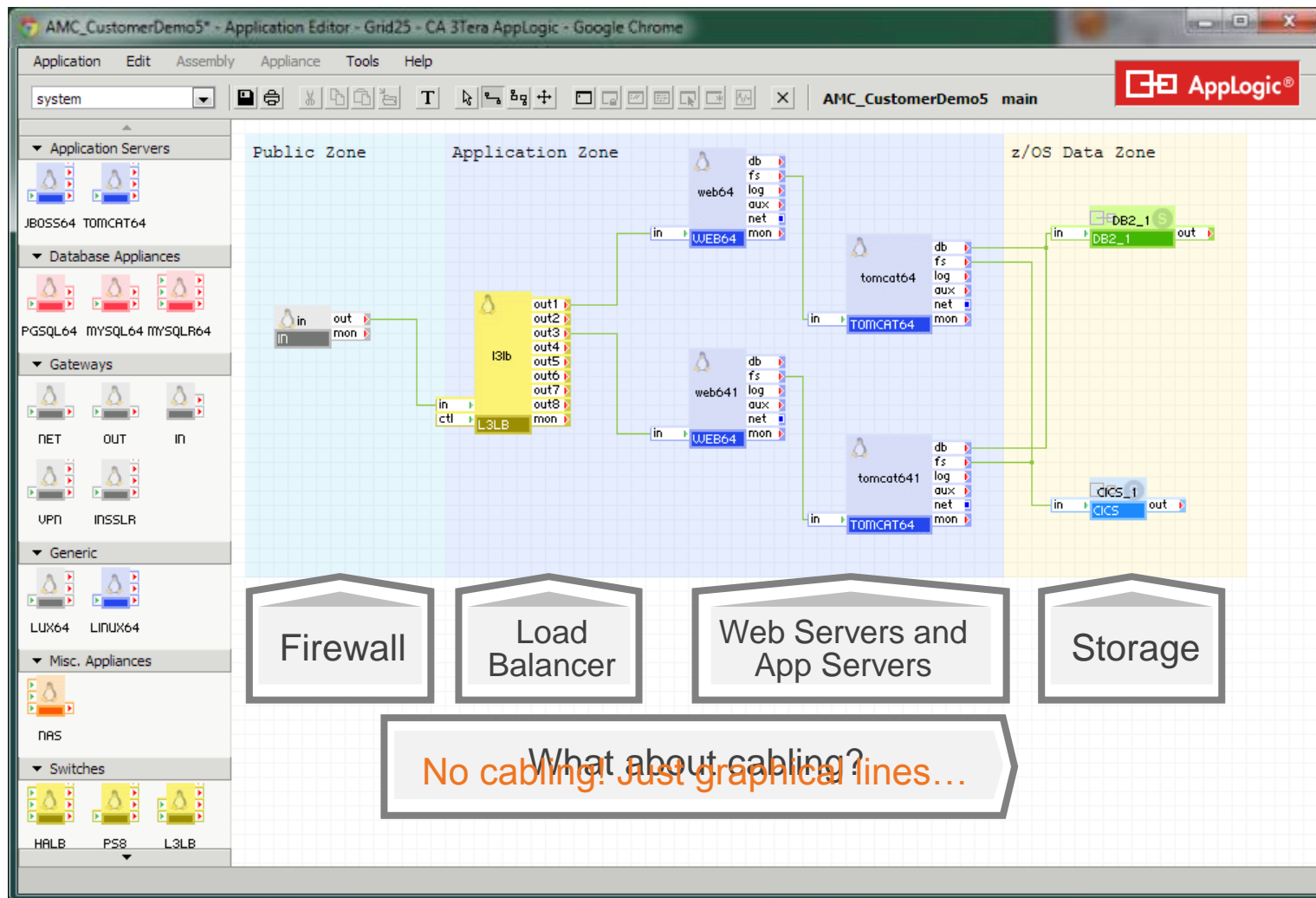
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- Current Deployment Options for Linux on System z
- CA AppLogic for System z - The Grid Architecture
- Closer Look at the Solution
- **Using CA AppLogic for System z**
- Summary



Using CA AppLogic® for System z *Putting it all together*



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Summary

Linux on System z
is the optimal
platform for
many scenarios

Today's
methods are
expensive,
slow and high
risk

CA AppLogic® for System z:

- Simplifies deployment and management of Linux on the mainframe
- Separates the application from the data center infrastructure
- Increases productivity while reducing risk



Interested in Seeing More?

Join us at the CA Technologies Booth in the Share Technology Exchange for a closer look!

Also, visit the CA Linux Management for Mainframe web portal at:

<http://www.ca.com/us/mainframe-linux.aspx>

AppLogic for Linux on z Documentation

<http://doc.3tera.com/AppLogic30z/>

Thank You



Contact Information

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